

MasterLine®

BY UNIVAR

475

Outperforms

Operator's Manual, Parts List & Service Manual

STOP!

If you are missing parts, instructions or have questions, **DO NOT** take this unit back to the store. Call 1-800-888-4897 and MasterLine will send the missing parts/information to you promptly

MAINTENANCE TIP: Cap gasket is prelubricated for improved sealing. Occasional lubrication is recommended, use petroleum jelly or non-water soluble grease.

SAFETY PRECAUTIONS

1. Before using sprayer with chemicals, fill sprayer with fresh water to assure that you have it properly assembled; pressurize and practice spraying. Also, check for any leaks at this time. When thoroughly familiar with the sprayer operation, follow normal operating procedures.
2. Ensure all pressure in the sprayer is relieved by locking the shut-off valve in the open position.
3. Avoid contact with chemicals.
4. **Always wear rubber gloves, safety goggles, appropriate protective clothing.**
5. Work in a well ventilated area.
6. Individuals should be trained in the proper use of this sprayer, chemical handling procedures, and first aid/emergency care. Where training is not available, individuals should study and follow the procedures detailed in this manual.

WARNING:

Chemicals can be harmful to individuals and the environment if improperly used. In addition, some chemicals are caustic, corrosive or poisonous and should be avoided. Read warnings and chemical manufacturers' instructions. **MASTERLINE** high density polyethylene sprayers are fitted with Viton® seals which are resistant to a wide variety of agricultural and household chemicals; however, care should be exercised to ensure that sprayer components are clean, functioning properly, and in a good state of repair before and during use. If in doubt about a particular chemical, check with the manufacturer. If you suspect or observe indications that the material may be unsafe in a **MASTERLINE** sprayer...**STOP. DO NOT USE OR APPLY CHEMICAL. ALWAYS WEAR RUBBER GLOVES, SAFETY GOGGLES, AND APPROPRIATE PROTECTIVE CLOTHING.**

- Read and follow operating instructions.
- Do not fill with, use or spray flammable materials.
- Do not modify sprayer.
- Never spray in the direction of humans, animals or property which might be injured or damaged by spray formula.
- Do not use disinfectants, solvents or impregnating agents unless first tested to ensure they are not harmful to the environment or sprayer.
- Do not use liquids with a temperature above 110°F (43°C).
- Rinse and clean sprayer thoroughly after using. Chemicals can be dangerous and cause serious injury to persons, animals, plants and environment.
- Wear appropriate protective clothing to prevent contact with chemical agents.
- Disposal of contaminated rinse should be in accordance with applicable ordinances. Observe the precautionary instructions of the chemical manufacturer.
- All servicing personnel should be trained and familiarized with chemical handling procedures, first aid/emergency care, and chemical liquid disposal regulations.
- **DO NOT USE ANY ACID (INCLUDING CITRUS) OR CAUSTIC CHEMICALS INCLUDING BLEACH.**
- Remember that a sprayer with liquid is a significant amount of weight (8 lbs. per gallon). Use caution when bending, leaning or walking. Do not bend at the waist when wearing the backpack. Bend only at the knees and support yourself as required to ensure personal safety.
- Keep in mind that the sprayer is vented at the cap and was intended to be operated upright.
- Do not climb or mount any equipment from which you might fall.

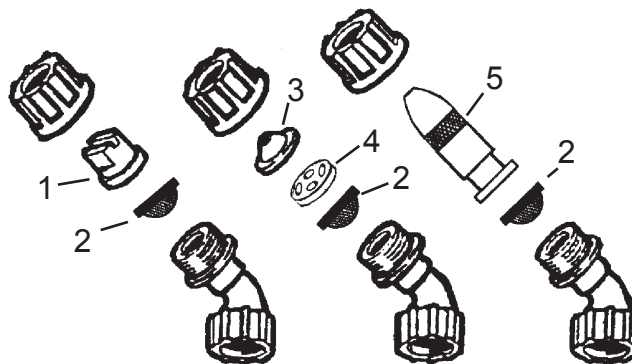
ASSEMBLY INSTRUCTIONS:

SPRAY TIP ASSEMBLY

Spray tips should be assembled as shown. O-rings are used in place of gaskets in some sprayers.

1. Flat Spray Nozzle
2. Filter
3. Jet Stream Nozzle
4. Swirl Plate
5. Brass Adjustable Nozzle

See Page 11 for Handle Installation.



MasterLine®

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REGULATING THE PRESSURE

The **MASTERLINE** backpack sprayer is equipped with a built-in regulator to control output pressure. This regulator is operator adjustable. Make adjustments prior to filling tank. To adjust the regulator, remove the tank cap and the filter basket. Look inside the spray tank; you will see the top of the regulator. There are 4 fingers sticking out of the cap. They are numbered 1,2,3,4. 1=15 psi, 2=30 psi, 3=45 psi, 4=60 psi. The higher the pressure, the more chemical applied from

the sprayer in a given amount of time, but the droplets will be smaller and tend to drift. The lower the pressure, the less chemical applied in a given amount of time, but the droplets will be larger with less drift. If the spray pressure must be changed, excess pressure in the pressure cylinder must be released back into the tank through the spray tube.

FILLING

Mix the spray formula and the proper volume of water in a separate container. Pour the mix through the filter basket in the tank opening. This keeps debris from entering sprayer. Note: To fill the sprayer to its full 4 gallon capacity, set the pressure regulator to the 3 or 4 setting. (Pressure regulator is mounted on top of the pressure cylinder inside formula tank. See Above: Regulating the Pressure.) Add 2 or 3 gallons of spray formula mix. Pump the sprayer handle to prime the pump and fill the pressure cylinder. The volume

of liquid in formula tank will appear to decrease as the pressure cylinder is filled. Liquid will flow through the top of the pressure regulator when the cylinder is completely full. Add the remaining formula mix to the tank. Remember that it's not necessary to fill the sprayer tank each time. Mix only the amount needed to get the job done.

Always read and follow manufacturer's instructions printed on the spray product label. This can save money and help prevent crop and environmental damage.

SPRAYING

Prime the pump with rapid pump strokes. When you feel very firm resistance, the pressure chamber is filling with liquid. With repeated strokes, the air in the pressure chamber is slowly compressed. By pressing the hand lever, the valve opens, and liquid is forced through the nozzle. The shut-off valve has a retaining clip which keeps the valve in the "OPEN" position for continuous operation. Pump using the end of the pump handle as it is less fatiguing. The volume

of liquid delivered varies with the working pressure which should be as high as needed to ensure an adequate spray pattern for each individual application.

NOTE: Should the pressure drop very quickly, drain the tank completely and pump without liquid. By this procedure, the air chamber is refilled with the required volume of air. It is advisable to pump the tank completely empty from time to time.

CLEANING

- After spraying, clean the tank thoroughly. If some spray liquid is left inside, drain tank completely.
- Follow the recommendations of the chemical manufacturer for disposal of waste water and storage of chemicals.
- Pumping causes air to be taken in and the remaining liquid to be discharged. Pump until liquid and air are coming out through the nozzle.

- Refill tank with a few quarts of clean water and pump the water out as explained above (if necessary, repeat this procedure several times).
- If the shut-off valve is removed, the pump can be flushed quickly. Improper spray distribution is the result of a clogged nozzle, which is easily removed and cleaned.
- Soap and water may also be used to clean tank.
- Do not use aggressive cleaning agents or abrasives.
- Activated charcoal in liquid or other form may be used to absorb chemicals in tanks or spills.

NOTE: When cleaning the sprayer after working with hormone weedkillers, follow the instructions of the herbicide producers. Neutralize with activated charcoal. (Example: add 0.35 oz. 1 g. of activated charcoal to 1.7 imp. pint 1 liter of water and leave this in the tank and the lines for approximately 24 hours. This is very important if other chemicals should be sprayed as the residues of the herbicide may damage susceptible plants. Cleaning after application of products containing carbolineum, if they are not water soluble, should be done with a 5% soda lye having a temperature of 104°F (40°C). Rinse with plenty of clean water.

WILL THE PLASTIC MATERIAL LAST?

Only high-density polyethylene is used. The material is chosen for high molecular weight, high impact strength, and excellent resistance to chemicals and stress. Ultraviolet inhibitors are used in the material to reduce deterioration caused by sunlight.

HOW HEAVY IS THE UNIT?

When empty, Model 475 weighs only 9.5 lbs.

IS THE SPRAYER COMFORTABLE TO CARRY?

MASTERLINE sprayers are probably the most comfortable spraying equipment on the market. The tank rests comfortably against the operator's back and the straps are made from a nylon web and are padded where they rest on the shoulders. The pump lever is positioned at the most convenient height and can be varied with adjustment of the straps.

CAN I USE WEEDKILLER AND INSECTICIDE IN THE SAME SPRAYER?

In theory you can, if the sprayer is thoroughly cleaned out with an ammonia: water solution of 1:25. In practice, the use of both types of chemicals in the same unit is not recommended as the risk to the plants can be high. Use caution when handling any type of chemicals and when cleaning your sprayer.

WHAT SPRAY NOZZLE SHOULD I USE?

A brass adjustable spray nozzle is supplied for varying the spraying pattern from a fine mist to a jet stream. A flat spray nozzle is supplied for spraying paths, garden beds, and general area spraying. A cone nozzle is also supplied for spot spraying and for treatment of bushes and small trees. For spot spraying, simply remove swirl plate from behind cone. Save the swirl plate for future use. Standard is a reflux filter with a built-in check valve which opens at 5 psi and closes at 4 psi. This virtually eliminates dripping of fluid still contained in the spray wand. A wide selection of nozzles such as the drift guard and no-drift nozzles are available.

CAN I DO SPOT SPRAYING?

The shut-off valve on the **MASTERLINE** sprayer is well suited for spot spraying. It's almost effortless! The shut-off valve handle incorporates a clip which holds the trigger valve open for area spraying without tiring the operator's hand. A pressure gauge may be added with increments from 5 psi up to 60 psi.

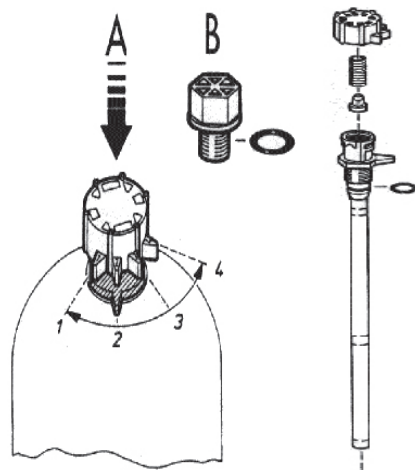
DOES THE UNIT REQUIRE CONSTANT PUMPING?

NO! The well-designed lever action greatly reduces the pumping effort. The pressure cylinder within the tank has a hydraulic effect. Liquid from the pump compresses air in the pressure chamber which allows irregular pumping action, yet results in steady spray at the nozzle.

CAN THE SPRAY TANK STAND THE PRESSURE?

Although quite strong, the spray tank itself is intended only as a container for the spray solution. Pressure is maintained in a separate pressure chamber. This chamber is injection molded and built to withstand normal operating pressure. Additionally, an internal pressure control valve has been fitted to the cylinder (see item A). It has four pressure settings adjustable to specific spraying needs (see diagram).

Setting #1	15 psi
#2	30 psi
#3	45 psi
#4	60 psi



CALIBRATION OF MASTERLINE BACKPACK SPRAYERS

The output of the sprayer should be checked by collecting and measuring the spray liquid emitted during one minute. Maintain steady pumping on the pump handle while measuring. Having determined the output from the nozzle in gallons/minute, the rate per unit area treated can be calculated knowing the swath width and walking speed.

$$\text{Gal/Acre} = \frac{(\text{Gal./min of nozzle}) \times 43560 \text{ Sq. ft./acre}}{(\text{Sq. ft./min.})}$$

Note: Gal/min for standard nozzles

Flat Spray Nozzle	15 PSI = .22 Gal./min. 29 PSI = .33 Gal./min. 44 PSI = .40 Gal./min.
Hollow Cone Nozzle	15 PSI = .17 29 PSI = .24 44 PSI = .29

$$\text{Sq. ft., min.} = \text{Speed (ft./min.)} \times \text{Swath Width (ft.)}$$

1. Determine the nozzle's rated capacity. See page 5 of **MASTERLINE** parts list for nozzle ratings. Get the capacity in gallons/minute at the desired pressure. Test the delivery of the nozzle. Spray for one minute and collect the spray.

$$\text{Gal/min} = \frac{\text{oz. collected/minute}}{128 \text{ oz.} = 1 \text{ gal.}}$$

2. Compute the area covered in square feet per minute. Select a comfortable walking speed and figure how many feet per minute you walk. A convenient fast walk for some is 2.5 mph, but this may vary. One mile per hour equals 88 feet per minute. An easy way to calculate is to simply measure the distance you walk in one minute.
3. Compute the gallons per acre. The above information is used to compute the gallons of spray that will be applied per acre.

WARNING: Remember that a sprayer with liquid is a significant amount of weight (8 lbs. per gallon). Use caution when bending, leaning or walking. Bend only at the knees and support yourself as required to ensure personal safety.

POSSIBLE USES OF SPRAYER:

Plant Feeding and Protection – A variety of spray tips enables user to perform foliar feeding or apply fungicides and pesticides effectively.

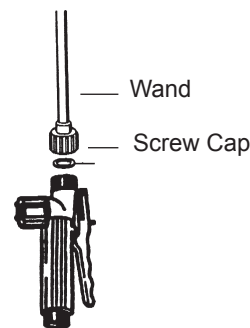
Herbicides – May be applied to reduce pesky weeds and plants; however, avoid using same sprayer for plant feeding or protection without first thoroughly cleaning. (See "Cleaning".)

Indoor Use – Sprayers may be used to apply detergents, vinegar, cleaning solutions, warm water up to 110°F (43°C) and other nontoxic household cleaning and maintenance liquids. Carpets, walls, glass, floors, ceilings and other surfaces can be treated. Do not use sprayer which has previously been used with herbicides, pesticides or other toxic chemicals.

Outdoor Use – Window cleaner, detergent, general purpose cleaning solutions, certain wood preservatives, waxes, waterproofing are among the many things **MASTERLINE** sprayers can apply. Avoid using sprayer for cleaning and other applications once it has been used for plant protection or herbicide spraying. If sprayer was used for herbicide or other spraying first, clean the sprayer as described on page 2 before using.





ASSEMBLY INSTRUCTIONS FOR WAND

1. Insert wand into shut-off valve, as shown.
2. Tighten the screw cap clockwise onto the shut-off valve.



OPERATING FEATURES:

Nozzles – Your **MASTERLINE** sprayer is standard with nozzle arrangements which provide a variety of spray patterns.

Item		Application	Part #
Flat Spray Nozzle		Row treatment	4074263
Jet Stream Nozzle		Spot & longer range	4074758
Jet Stream Nozzle and Swirl Plate = Hollow Cone		Shrubs and bushes	4074756 4074758
Brass Adjustable Nozzle		Spot, shrubs & bushes	4900207

ACCESSORIES:

The following accessories are not standard. Order them from your **MASTERLINE** dealer.

Pressure Control Gauge (#4900356):

Displays spraying pressure so operator can maintain desired pressure level.

Pressure Limiting Valve (#4900183):

Limits pressure to 5 psi, 10 psi or 15 psi as needed for low pressure applications.

Drift Guard (#4900430):

Helps control application of formula under breezy conditions.

4-Nozzle Spray Boom (#4900298):

Mounted on the back part of the sprayer frame with 4 hollow cone jets for area treatment (total width 49-3/4"; distance between nozzles 16").

2-Nozzle (#4900514):

Handheld spray boom mounts on end of spray wand (total width 33"; distance between nozzles 24"). Includes 2 flat spray nozzles.

Twin Nozzle (#4900477):

This is a multi-purpose nozzle that attaches to the end of spray wand for double row application.

Carbon Fiber Wand (# 4900445)

The telescoping adjustable 4' to 8' carbon fiber wand is ideal for small fruit trees, large shrubs, and "formerly" impossible places.

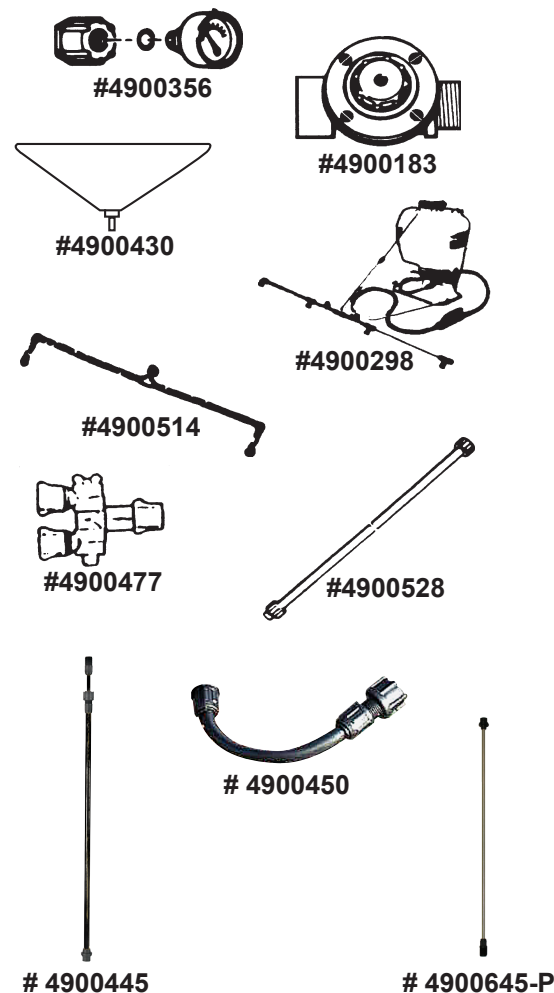
Brass Spray Wand (#4900528):

The spray wand is 60" (150cm) long and replaces the standard spray tube for treating trees up to heights of 16 ft. (5 meters). Additional extension tube available in 20" length (#4900421)

21" Stainless Steel Wand (# 4900645-P)

Bendable Extension (# 4900450)

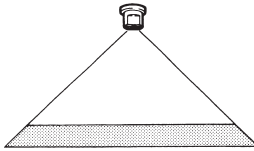
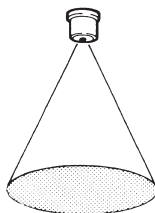
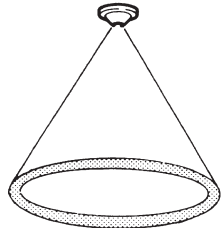


This 6" extension can be easily bent to any direction. When finished spraying, straighten or leave in position. Can be repeatedly bent and straightened to meet user needs.



In the best interest of continued technological progress, we reserve the right to change design and configuration of any product without prior or other notice. Therefore, please note that text and illustrations of this manual are not to be considered binding and do not constitute a basis for legal or other claims.



Specification of Nozzle Tips

Specification	Order Number	Delivery		Pressure		Angle	Applications	
		l/min	US gal /min	atu atm	psi			
Flat Spray Tip	4074263*	0.88 1.25 1.53	.23 .33 .40	1.0 2.0 3.0	15 29 44	120° 120° 120°	Area and row treatment 	
Flat Spray Nozzle	0065210 0065132	0.46 0.64 0.78	.12 .17 .21	1.0 2.0 3.0	15 29 44	80° 80° 80°		
Adjustable Nozzle-Brass	4900207	Tree Spraying (adjustable spraying pattern)						
Full Cone Nozzle	0065212					30°-50°	Game repellants of high viscosity	
Full Cone Nozzle	0065213					30°-50°	Game repellants of low viscosity	
Full Cone Nozzle	0065214						Game repellants	
Hollow Cone Nozzle 1 mm orifice	4900209	0.4 0.55	.10 .15	1.0 2.0	15 29		Shrubs, bushes	
Hollow Cone Jet 1.4 mm orifice	4900252*	0.64 0.91 1.11	.17 .24 .29	1.0 2.0 3.0	15 29 44			50° 65° 65°
Hollow Cone Jet 1.8 mm orifice	4900322	0.88 1.25 1.53	.23 .33 .40	1.0 2.0 3.0	15 29 44			55° 70° 72°
No-Drift AN 0.5	4074383	0.23	.06	1.0	15	90°	Mainly for herbicides at low pressure 	
No-Drift AN 1.0	4074385	0.28 0.38 0.46	.07 .10 .12	0.4 0.7 1.0	6 10 15	100° 100° 100°		
No-Drift AN 2.0	4074386	0.55 0.76 0.91	.15 .20 .24	0.4 0.7 1.0	6 10 15	100° 100° 100°		
No-Drift AN 2.5	4074514	0.72 0.95 1.14	.19 .25 .30	0.4 0.7 1.0	6 10 15	110° 110° 110°		
No-Drift AN 5.0	4074513	1.80 1.90 2.28	.48 .50 .60	0.4 0.7 1.0	6 10 15	120° 120° 120°		
Foam Nozzle	4900397	0.76 0.90 1.01 1.10	.20 .23 .26 .29	3.0 4.0 5.0 6.0	45 60 75 90		The XAN 2 nozzle is suited for low dirt and water saving application of herbicides which tend to foam	

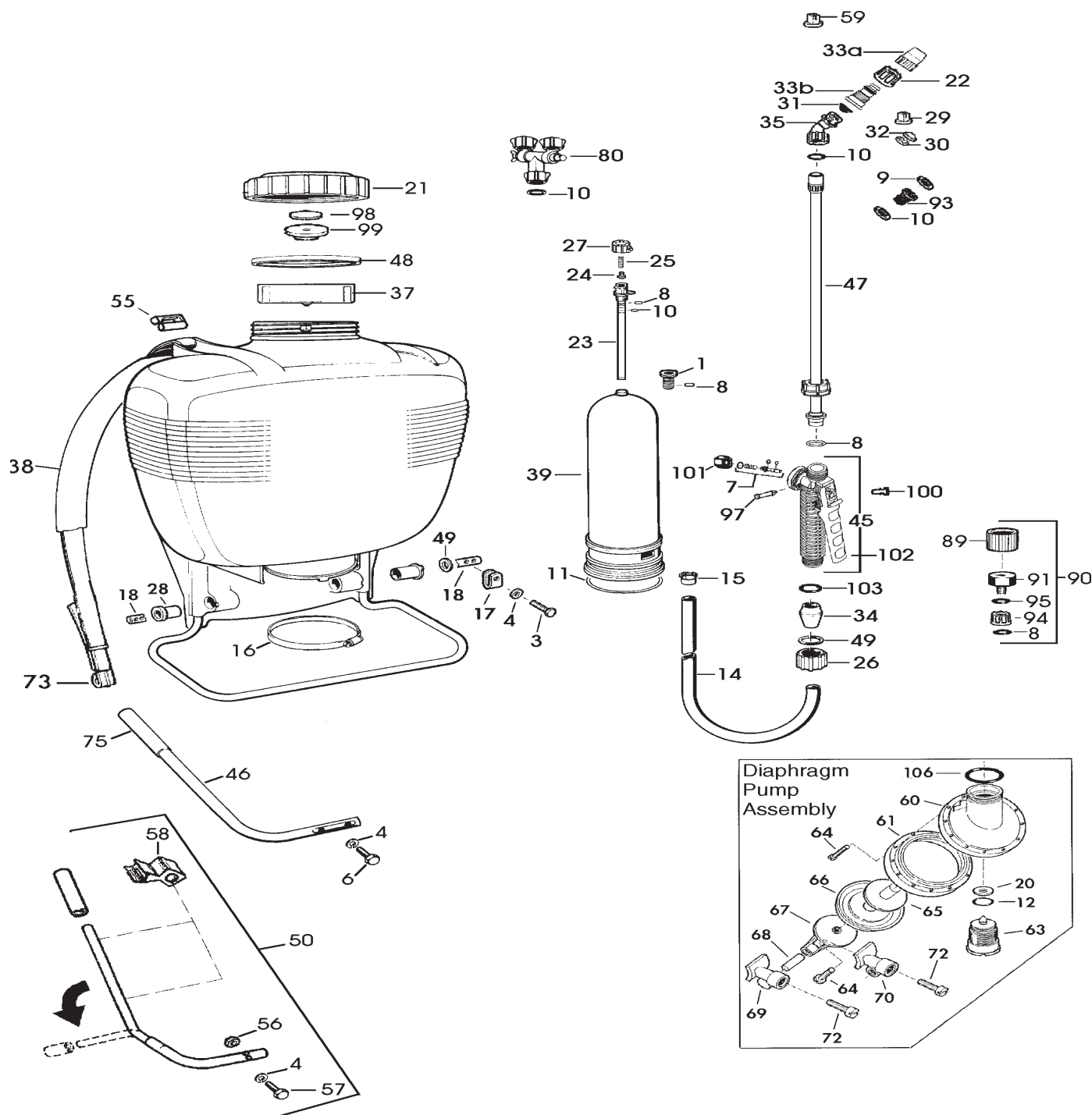
*Standard Equipment



SPARE PARTS LIST

Liste de pièces de rechange

Lista de piezas de recambio



SPECIAL PARTS AND ACCESSORIES (Not shown in parts list)

Order No.	Description
0610406-K	Diaphragm Pump Repair Kit includes 8, 11-13, 20 (2 ea), 24, 25, 66
0610411-K	Wand Repair Kit includes 7-10, 22, 26, 34, 49, 103
4400221	Pump Assembly (does not include #69 and #72)



Pos. No.	Order Nr.	DESCRIPTION	FRANCAIS	ESPAÑOL
2	0010165	Fill. Head Screw	Vis T.C.	Tornillo cil.
3	0012185	Fill. Head Screw	Vis T.C.	Tornillo cil.
4	0030131	Washer	Rondelle	Arandela
6	0012185	Fill Head Screw	Vis T.C.	Tornillo cil.
7	0610402-K	Shut-Off Valve Repair Kit	Pochette robinet d' arrêt	Juego rep. grifo de cierre
8	0062258	Gasket	Joint de connection	Junta de conexión
10	0062115	O-Ring	Joint bague	Anillo O
11	0062291	O-Ring	Joint bague	Anillo R
12	0062139	O-Ring	Joint bague	Anillo R
13	0062140	O-Ring	Joint bague	Anillo R
14	0064234	Hose (48" length)	Tuyau	Manguera
15	0066388	Hose Clamp	Collier cpl.	Abrazadera
16	0066394	Clamp	Collier cpl.	Abrazadera
17	4043123	Stop Plate	Butée	Pieza de apoyo
18	4035111	Pump Shaft	Tuyau	Tubo
20	4061257	Valve Plate	Joint de soupape	Place de valvula
21	4200242	Tank Cap w/Valve Assy. (incl. 48)	Couvercle	Tapa del depósito
22	4074148	Retaining Nut	Ecrou de raccord	Tuerca de manguito
23	4074323	Valve Body	Pièce de réglage	Pieza de ajuste
24	4074350	Seal Ring	Joint	Junta
25	0070260	Compression Spring	Ressort de compression	Resorte de presion
26	4074337	Screw Cap	Ecrou de raccord	Tuerca de manguito
27	7047344	Control Knob	Pièce de réglage	Tapa de ajuste
28	7074410	Bushing	Coussinet	Cohinete
29	4074263	Adj. Spray Nozzle		
30	4074756	Swirl Plate	Pièce giratoire	Pieza de rayado
31	4074283	Jet Filter	Tamis de gicleur	Piltro de tobera
32	4074755	Jet Cap	Capuchon de gicleur	Tapa de tobera
33	4900527	Flat Spray Jet	Buse a diffusion large	Tobera de chorro ancho
34	4074500	Clamp	Pièce de serrage	Pieza de retencion
35	4074527	Elbow	Coude	Code
36	4200162	Tank and Frame Assy.	Support de réservoir, 151	Soporte de depósito, 151
37	4200166	Filter Basket	Entonnoir	Embudo Filtro
38	4300315	Carrying Strap (item 73 incl.)	Bretelle (Pos. 73 incl.)	Correaje (Pos. 73 incl.)
39	4400240	Pressure Cylinder	Corps de pompe	Camara de aire
		(item 10, 23-25, 27 incl.)	(Pos. 10, 23-25, 27 incl.)	(Pos. 10, 23-25, 27 incl.)
40	4400168	Cylinder, assy.	Cylindre cpl.	Cilindro mont
41	4074409	Connecting Rod without Stud	Bielle sand téton	Biela
42	4074262	Lever	Levier	Palanca
43	4073558	Piston	Piston	Piston
44	4400189	Viton® Collar	Manchette Viton	Manguito Viton
45	4800170	Shut-off Valve, assy.	Robinet d'arrêt	Grifo de cierre, mont.
46	4800173	Fold Away Handle	Levier de pompe (pos. 75 incl.)	Palanca de bomba (Pos. 75 incl.)
47	4900230	Spray Tube (20")	Tuyau pulvérisateur (500 mm)	Tubo atomizador (500 mm)
48	4061342	Gasket	Joint bague	Anillo de junta
49	0031356	Washer	Rondelle	Arandela
51	4074677	Protective Cover	Coiffe protectrice	Tapa protectora
52	0010110	Fill. Head Screw	vis T.C.	Tronillo cil.
53	0020101	Hex. Nut	Ecrou. hex.	Tuerca hex.
54	4074408	Connecting Rod with Stud	Bielle avec teton	Biela
55	4074412	Buckle	Porte-bretelle	Hebilla para correa
60	4073411	Housing (Diaphragm)	Carter de membrane	Carter membrana
61	4073410	Flange	Joint bague	Anillo O
63	4400222	Valve, assy (item 12, 20 incl.)	Siège soupape (Pos. 12, 20 incl.)	Pieza rosada (Pos. 12, 20 incl.)
	4400222-T	Valve tool		
64	0018257	Fill. Head Screw	Vis T.C.	Tornillo cil.
65	4074247	Plunger	Plaque à membrane	Chapa de membrana
66	4074245	Diaphragm	Membrane	Membrana
67	4074233	Lever	Bielle	Biela
68	4031130	Wrist Pin	Goujon	Perno
69	4074234	"R" connecting Bracket	Levier 1	Palanca 1
70	4074243	"L" connecting Bracket	Levier 2	Palanca 2
72	0010141	Fill. Head Screw	Vis T.C.	Tornillo cil.
73	4074833	Hook	Accroche	Gancho
74	4900252	Hollow Cone Jet Nozzle	Jet conique, cpi	Tobera, cono hueco, mont.
		(item 30,32 incl.)	(Pos. 30, 32 incl.)	(Pos. 30, 32 incl.)
75	4074392	Grip		
97	4074295	Plastic Pin		
98	4061464	Vent Plate		
99	4074123	Vent Cap		
100	4074329	Lock Clip		
101	4074336	Retaining Nut		
102	4074355	Hand Lever		
103	0062271	O-Ring		
106	0062324	O-Ring		
Accessories - Accessoires - Los Accesorios				
1	4200215	Plug (item 10 incl.)	Bouchon (Pos. 10 incl.)	Tapón (Pos. 10 incl.)
9	0062106	Gasket	Joint de sorteJoint bague	Junta
80	4900477	Twin Nozzle	Buse Double	Tobera doble
81	4900528	Extension Wand (1250 mm) 60"	Rallonge (1250 mm)	Tubo de extension (1250 mm)
90	4900356	Pressure Gauge w/Connection Parts	Manomètre avec raccords	Manometro con piezas de conexión
91	0065186	Pressure Gauge	Manomètre	Mandometro
92	4900513	Extension Wand (500 mm) 20"	Rallonge (500 mm)	Tuba alargador (500 mm)
93	2700316	No Drip Check Valve	Clapet anti-retour	Valvula de retencion
94	4074338	Screw Cap	Ecrou de raccord	Tuerca de manguito
95	0062249	O-Ring	Joit bague	Anillo O
---	4900430	Drift Guard	Bouchier	Pantalla rociadora
47	4900319	Spray Wand (690 mm) 27"	Tuyau Pulvérisateur	Tubo Atomizador
---	4300314	Shoulder Saver Harness	Accessoire bio	Agregado bio
---	4200205	Reduction Insert, Gaskets incl.	Pochette joints	Empaquetaduras
96	4900258N	Elbow Nozzle Assy.		Juego Empaquetaduras





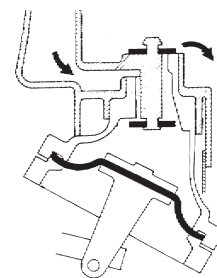
SERVICE AND REPAIR SECTION

HOW THE PUMPS WORK

During the upward stroke of the handle on the diaphragm, liquid is drawn from the formula tank through the intake channel into the space above the pump. The lower valve plate opens the intake channel while the upper valve plate closes the transfer ports. During subsequent upward strokes the previously siphoned liquid is forced through the four transfer ports and into the pressure cylinder. During this compression phase, the upper valve plate opens the transfer ports and the lower valve plate closes, sealing the intake channel. The transfer ports cannot be sealed by the lower valve plate.

Through repetition of these diaphragm strokes, the air in the pressure cylinder is being slowly compressed by the forced-in liquid. A prerequisite for this condition is a closed shut-off valve. These pumping strokes can be carried out until the required pressure is reached.

After opening the shut-off valve, continue to pump slowly and steadily in order to maintain a consistent rate of discharge.



Type 475

BACKPACK SPRAYER TROUBLE SHOOTING GUIDE

PROBLEM	CAUSE	SOLUTION
Difficulty in Moving Pump Lever	<ul style="list-style-type: none">• Dirty Bushing	<ul style="list-style-type: none">• Remove Pump Lever, Clean & Grease Bushings
Insufficient Resistance During Repeated Pumping and No Pressure	<ul style="list-style-type: none">• Damaged/Dirty Valve Plates• Damaged O-Ring at Valve Seat• Seal in Pressure Regulator is Leaking	<ul style="list-style-type: none">• Clean or Replace Valve Plate or Cylinder• Replace O-Ring• Check Seal and Valve Seat
High Resistance After Just a few Pumping Strokes, Pressure Lasts Only Briefly	<ul style="list-style-type: none">• Little or No Air Cushion in Pressure Cylinder	<ul style="list-style-type: none">• Remove PVC Hose, Drain Pressure Cylinder, Reconnect Hose, Preventive Measure - Release Pressure After Each Use
During Spraying, Upward Pumping Becomes More & More Difficult and Tank Walls May Indent Inwards	<ul style="list-style-type: none">• Wrong Formula Tank Cap (No Vent Hole)• Vent Hole Clogged• Lower Valve Plate Sticks• Intake Channels Clogged	<ul style="list-style-type: none">• Replace with Vented Cap• Clean Vent Hole• Replace Valve Plate• Clean Channels & Tank
When Handle is Pulled Up It Wants to Move Itself Forcibly Back Down	<ul style="list-style-type: none">• Inlet Screen at Base of Pressure Cylinder Clogged	<ul style="list-style-type: none">• Clean Intake Screen with a Small Brush and Detergent
Leaks on Diaphragm Pump (475)	<ul style="list-style-type: none">• Damaged Diaphragm• Damaged O-Ring on Diaphragm Housing• Damaged O-Ring on Pressure Cylinder	<ul style="list-style-type: none">• Replace Diaphragm• Replace O-Ring• Replace O-Ring
Leaks From End of Spray Wand	<ul style="list-style-type: none">• Worn or Damaged Shut-off Valve	<ul style="list-style-type: none">• Inspect and Rebuild Shut-off Valve.
Leaks from Tank Opening	<ul style="list-style-type: none">• Improper Lubrication	<ul style="list-style-type: none">• Lubricate cap gasket with petroleum jelly or non-water soluble grease.

Note: Always wear rubber gloves, safety goggles and appropriate protective clothing when repairing a sprayer. Once a repair is completed, fill the unit with clean water, pressurize, and check for leaks. If the sprayer leaks, **Do Not Use**. Repair leaks and recheck.

DIAPHRAGM PUMP DISASSEMBLY AND REPAIR

- 1) Loosen the stop plate (A) and remove the two allen head screws (B) that hold the connecting pieces to the pump rod. Figure 13.

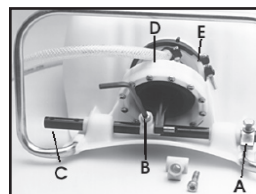


Figure 13

- 2) Remove the pump rod (C) and the hose (D). Next, loosen the clamp at the base of the sprayer (E). Figure 14.



Figure 14

- 3) Push the pressure cylinder approximately 1" out of the bottom of the tank. Then turn the pump assembly 180°.

- 4) Next, remove the 12 torx screws that hold the flange in place. The flange and diaphragm can then be removed. Figure 15. Note: For clarity of this information the pressure cylinder is shown removed from the tank.



Figure 15

- 5) To replace the diaphragm, remove the connecting rod retaining screw (G) from the plunger and lever (F). Replace the diaphragm and reassemble. See Figure 16.

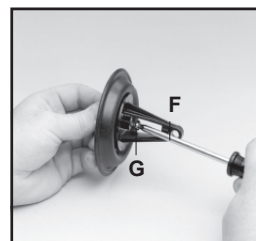


Figure 16

- 6) The valve assembly (H) is removed using a locally made tool. See tool drawing for measurements. Remove valve plate retaining pin and insert tool into slots. See Figure 18. Use a screwdriver to rotate tool counter-clockwise.

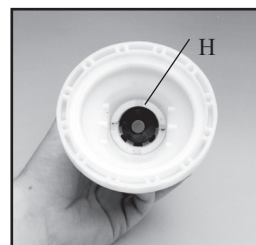
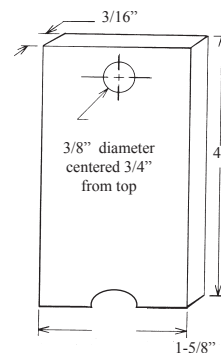


Figure 17



Tool can be made locally using the following dimensions or can be ordered from MasterLine (part # 4400222-T)

- 7) Once the valve assembly is removed, the valve plates and O-rings can be replaced. Figure 18.

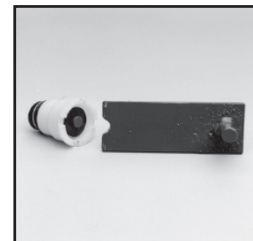


Figure 18

- 8) The pump housing (I) is separated from the pressure cylinder (J) by pulling it off. Figure 19. The O-ring can then be replaced.

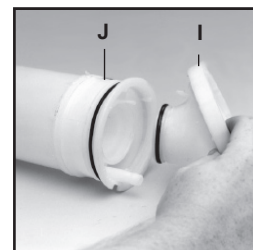


Figure 19

- 9) When reassembling the pump housing to the pressure cylinder, be sure the square tab on the pump housing (K) is aligned in the notch. See arrows (L) on the pressure cylinder in Figure 20. Be careful not to pinch or nick the O-ring.

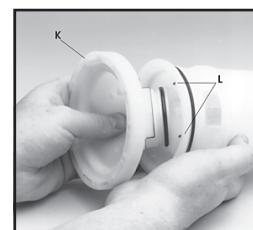


Figure 20

- 10) Screw the valve assembly into the cylinder. Be sure that the two square holes on the threaded portion of the valve assembly are aligned with the holes in the pressure cylinder. If the pressure cylinder was removed, look through the inlet screen to check alignment. If the pressure cylinder was not removed, the four holes of the valve assembly must be centered on and facing the hose nipple.

- 11) Re-install the diaphragm and the flange with the twelve screws. Note: The rib on the lever should be facing and in line with the hose nipple. Tighten the large clamp and re-install other parts.

PRESSURE CYLINDER DISASSEMBLY & REPAIR

The pressure cylinder should be removed **only if** the screen is clogged or there is a leak from where the pressure cylinder and tank meet.

- 1) Loosen the screw holding the black clamp around the pressure cylinder and remove clamp. Set the tank on the floor, remove the control knob (B) from the top of the pressure cylinder. To do this, push the control knob down and rotate it counter-clockwise, then lift off. Now unscrew the valve body and set aside. With one hand holding onto the neck of the tank, grasp the pressure cylinder with your other hand. While moving the pressure cylinder from side to side, push down using your body weight to free the cylinder from the tank. Figures 22 and 23. If the cylinder will not push out by hand, use a 12" - 18" piece of 2" x 4" and a heavy hammer. Place a rag on top of the pressure cylinder, then place the piece of wood on the rag. With a few forceful blows the cylinder will come out of the tank. With diaphragm pumps, once the cylinder drops an inch out of the tank, rotate the pressure cylinder 180°. Put the tank aside for now.
- 2) Once the pump cylinder is removed, the large O-ring (A) can be replaced. Figure 21. Note: The new O-ring should be slid onto the pressure cylinder from the top to the recess. It should not be stretched over the flange at the bottom.
- 3) Remove the O-rings on the valve body and replace with new ones. Apply a small amount of grease to the O-rings and threads and reassemble. Figure 24. Note: The adjustment piece has been painted white for clarity of the O-rings in photo.
- 4) The spring and the sealing piece on the control knob are removed by pulling them apart. The new ones push together. See Figure 24.
- 5) If the inlet screen on the pressure cylinder is clogged, it should be cleaned with a small hard bristle brush and detergent before reassembling. Figure 25. Note: If the pump handle tends to spring to the down position when you lift up, the inlet screen is clogged.
- 6) Place the tank upside down on the floor and apply grease to the lip of the pressure cylinder (C) and O-ring (D). Place the pressure cylinder in the tank, lining up the tab on the tank with the notch in the pressure cylinder. (For diaphragm pumps, the notch on the pressure cylinder should be 180° out of alignment with the tab on the tank.) Rock the cylinder back and forth while pushing down forcefully. (Once the diaphragm pump is 1" from the tank, rotate the cylinder to align the tab and notch.) If necessary, use a 12" - 18" piece of 2" x 4" to apply downward force on the pressure cylinder for final seating. Be sure to use a rag to protect the pressure cylinder.

Figure 21



Figure 22



Figure 23

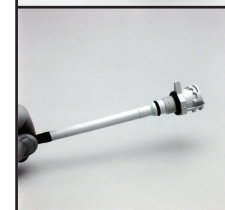


Figure 24

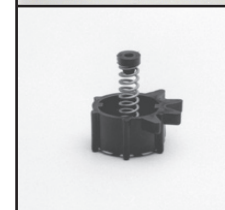


Figure 25

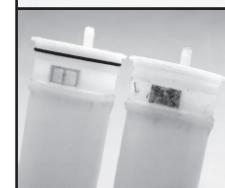
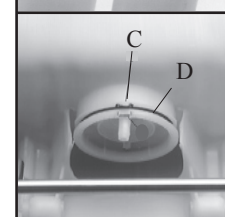


Figure 26



SHUT-OFF VALVE DISASSEMBLY & REPAIR

- 1) Complete Shut-off Valve. Figure 27.
- 2) Remove the retaining pin (A). Press the split end of the pin on a hard surface (such as a table) and push. Once the retaining pin pops up, remove the pin. Now slide the handle off the valve body.
- 3) With the handle off, remove the screw cap, spring, and valve body. Replace worn parts. Lubricate the O-rings and reassemble in reverse order. Note: The valve body (B) depicted is white for clarity. Figure 29. Next, place the handle groove into the slotted part of the valve body, making sure that the locking clip is positioned correctly. Insert the retaining pin. Push down on the handle and release repeatedly so the grease distributes evenly.

Figure 27



Figure 28

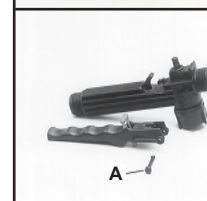
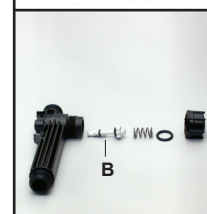
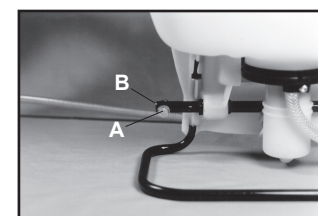


Figure 29



FOLD-AWAY PUMP HANDLE INSTALLATION

- 1) Remove bolt and nut (A) from pump rod (B).
- 2) Slide handle assembly over the pump rod and align the holes so that the rear (elbow) portion of the handle points up and slightly forward and away from the **MASTERLINE** logo. Reinstall bolt and locknut. Pump handle can be installed on the opposite side of the sprayer for right hand pumping. (Stop plate will need to be relocated to the left side.)
- 3) The handle can be rotated to either the down (pumping) or up (storage) positions. Note: The handle swings away from the sprayer, then up or down as desired. The spray wand attaches to the clamps on the handle assembly for storage.



STORAGE TIPS

- After operation, the sprayer should be stored in a dark place to prevent UV damage.
- Before winter, drain all liquid in tank, lines and air chamber. (See "Cleaning").
- Leave shut-off valve locked in the "open" position.
- Regularly inspect hose, wand, pump, tank and shut-off valve for wear, damage or leaks. Repair promptly.
- For service, call your nearest **MASTERLINE** dealer. Always insist on original **MASTERLINE** spare parts.



Equipment One-Year Limited Warranty

1. **What Is Covered By This Warranty.** **MASTERLINE** warrants, to the original purchaser only, that the Equipment that is the subject of this sale (a) conforms to **MASTERLINE's** published specifications, and (b) is free from defects under normal service, for a one-year period from the original date of delivery. This warranty does not include damage to the Equipment resulting from occurrences set forth hereinafter in (2). If the purchaser discovers within this period a failure of the Equipment to conform to specifications or a defect in material or workmanship, they must promptly notify **MASTERLINE** in writing of such claim. Any claims under this warranty must be received in writing by **MASTERLINE** within 13 months from the date of original delivery. Within a reasonable time after such notification, **MASTERLINE** will replace any defective component of the Equipment or part thereof. **MASTERLINE** will provide the components or parts at **MASTERLINE's** expense. Labor is to be performed by the original purchaser. (**MASTERLINE** will provide purchaser a labor allowance at **MASTERLINE's** current flat rate schedule.) **MASTERLINE** will make the final determination as to the amount of hours to be reimbursed to the purchaser for labor. All defective parts shall be returned to **MASTERLINE** if requested. These remedies are the original purchaser's exclusive remedies for breach of warranty.
2. **What Is Not Covered By This Warranty.** **MASTERLINE** does not warrant (a) any product, components or parts not manufactured by **MASTERLINE**; (b) defects caused by failure to provide a suitable installation environment for the Equipment; (c) damage caused by use of the Equipment for purposes other than those for which it was designed; (d) damage caused by accident or disasters such as fire, flood, wind and lightning; (e) damage caused by unauthorized attachments or modification; or (f) any other abuse or misuse of the Equipment.
3. **EXCLUSIVE WARRANTY.** THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OR REMEDIES, WHETHER WRITTEN, ORAL OR IMPLIED. ANY AND ALL IMPLIED WARRANTIES OR MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, COURSE OF DEALING OR USAGE OF TRADE ARE HEREBY EXPRESSLY DISCLAIMED AND EXCLUDED.
4. **LIMITATION OF REMEDIES.** UNDER NO CIRCUMSTANCES, EXCEPT TO THE EXTENT PROHIBITED BY APPLICABLE LAW, SHALL **MASTERLINE** BE LIABLE FOR ANY LOSS OR DAMAGE, DIRECT OR INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL ARISING OUT OF THE USE OF OR INABILITY TO USE THIS EQUIPMENT INCLUDING BUT NOT LIMITED TO ANY CLAIM FOR LOSS OF PROFITS, LOSS OF SAVINGS OR REVENUE, LOSS OF USE OF THE EQUIPMENT OR ANY ASSOCIATED EQUIPMENT, FACILITIES OR SERVICE, DOWNTIME, THE CLAIMS OR COSTS OF THIRD PARTIES INCLUDING CUSTOMERS, AND INJURY TO PROPERTY.

Some states do not allow limitations on how long an implied warranty lasts or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.
5. **Time Limit For Claims.** Any claim for breach of warranty or claims under this warranty must be received by **MASTERLINE** within 13 months following delivery of the equipment.
6. **No Other Warranties.** Unless modified in writing signed by both parties, this agreement is understood to be the complete and exclusive agreement between the parties, superceding all prior agreements, oral or written, and all other communications between the parties relating to the subject matter of this agreement. No employee or representative of **MASTERLINE** or any other party is authorized to make any other Warranty or to assume any other liability in connection with the sale of its Equipment.
7. **Future Changes.** **MASTERLINE** reserves the right to reserve, change or modify the construction and design of its Equipment or any component part or parts thereof without incurring the obligations to make such changes or modifications in present equipment.
8. **Allocation Of Risks.** This agreement allocates the risks of equipment failure between **MASTERLINE** and the original purchaser. This allocation is recognized by both parties and is reflected in the price of the goods. THE PURCHASER ACKNOWLEDGES THAT IT HAS READ THIS AGREEMENT, UNDERSTANDS IT, AND IS BOUND BY ITS TERMS.
9. **How To Contact MASTERLINE.** If during the warranty period, the **MASTERLINE** equipment does not function properly due to defect, simply contact the **MASTERLINE** Service Department at (800) 888-4897.

HOW TO ORDER PARTS

1. Your account number if available.
2. Your name and address and the address where you want the part to be shipped.
3. The Model/Serial No. of the equipment.
4. The **MASTERLINE** Part No. and the quantity desired. (Please do not use reference numbers.)

NOTE: Inspect all shipments on receipt for damage or missing parts. File a claim with the carrier before accepting a damaged shipment.

We reserve the right to change designs, specifications and equipment at any time without notice and without incurring any obligations.